A MAP OF GROUNDWATER RESILIENCE TO CLIMATE CHANGE IN AFRICA

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To understand and characterise the resilience of African groundwater to climate change requires an understanding of aquifer properties, particularly transmissivity and storage. However, quantitative data on transmissivity and storage are scarce for most of Africa. A new groundwater resilience map has been developed for Africa which incorporates proxies for these parameters: typical borehole yields; an aquifer storage type based on lithology; and an estimation of probable aquifer thickness. The map was developed using a four stage process.

1. A geological basemap – the UNESCO 1:5 million scale geological map of Africa – was selected and modified. Precambrian rocks were split into three hydrogeologically significant units (meta-sedimentary, mobile (orogenic) belt, and craton), and sedimentary rocks were classified by the major sedimentary basins to which they belong.

2. Published hydrogeological maps were scanned and georeferenced and used to help further combine or divide geological units and to help attribute the geological map with proxy aquifer properties data. Most of these hydrogeological maps are at a national or country scale, typically 1:1 million to 1:2 million. A few are regional maps (e.g. west and central Africa), typically at 1:5 million scale. Virtually all of Africa is covered by a hydrogeological map of some form, although they vary greatly in published age and in the level of geological and hydrogeological detail available.

3. Additional hydrogeological data and information were used to further parameterise and increase confidence in the new map. More than 200 studies reported in easily accessible published and unpublished literature were collated and georeferenced. Significant effort was made to ensure the systematic and transparent review, assessment and inclusion of hydrogeological information from both maps and previous studies. As part of this, confidence rankings were assigned to all the studies that provided hydrogeological information, using systematic confidence criteria.

4. The first draft of the groundwater resilience map will be subject to peer review by experts in African hydrogeology during November 2010. The feedback from the peer review will be incorporated into a final map that will be freely available online in several forms appropriate to different user needs, such as GIS-users, modellers, and policy makers.

The map of groundwater resilience across Africa will provide a preliminary assessment at a continent-scale of how groundwater can support adaptation and build resilience to climate change. More information is available from www.bgs.ac.uk/GWResilience/ .